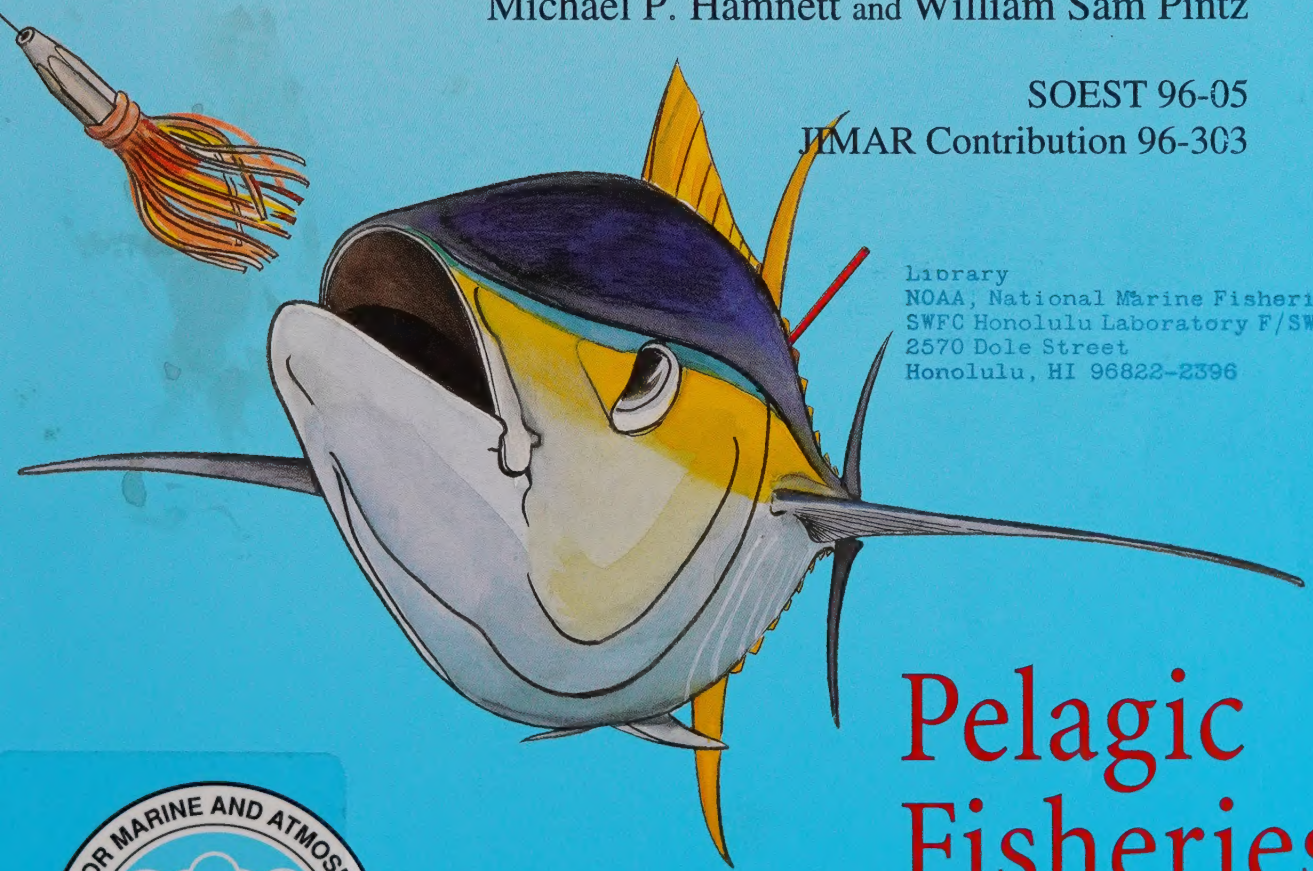
The Contribution of Tuna Fishing and Transshipment to the Economies of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam

Michael P. Hamnett and William Sam Pintz

SOEST 96-05
JIMAR Contribution 96-303

Library
NOAA, National Marine Fisheries Ser
SWFC Honolulu Laboratory F/SWC2
2570 Dole Street
Honolulu, HI 96822-2396



Pelagic Fisheries Research Program

SH
214.6
.S64
96-05
c. 1

NMFS Honolulu Library
00000000002379

The Contribution of Tuna Fishing and Transshipment to the Economies of American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam

Michael P. Hamnett
Center for Development Studies
Social Science Research Institute
University of Hawaii
Honolulu, HI 96822

and

William Sam Pintz
Resource Economist
410-024 Manana St.
Waimanalo, HI 96795

Library
NOAA, National Marine Fisheries Service
SWFC Honolulu Laboratory F/SWC2
2570 Dole Street
Honolulu, HI 96822-2396

SH
214.6
.S64
no96-

SOEST 96-05
JIMAR Contribution 96-303

Digitized by the Internet Archive
in 2025

https://archive.org/details/pelagic-fisheries-research-program_1996_96-05

Contents

Preface v

Introduction 1

Historical Background 1

I: Industry Trends Affecting Tuna Operations in American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam 3

A. Overview 3
B. New Transshipment Patterns 4
Land-Fish-Locally Policy 4
Restriction on Mother Ship Operations 5
Emergence of Air Transshipment Hubs in Guam and Saipan 6
Frozen Tuna Transshipment in Guam and Potentially FSM 6
Tuna Transshipment in the Marshall Islands 8
Exports from Palau 9
Future Airlift Capacity from Guam 10
Baitfish Aquaculture on Guam 10
C. New Fish Processing Operations in Papua New Guinea 11
D. Changes in US Policy of Potential Importance to Tuna Operations in the Territories 12
The Evolving Economics of Tuna Packing in American Samoa 12
Amendments to the Magnuson Act 13

II: Fishing Vessel Expenditures in American Samoa and Guam 13

A. Elements in the Study 13
Direct and Support Expenditures 13
Fishing Vessel Port Calls 14
The Secondary and Indirect Impact of Tuna Expenditures 15
B. Analytical Framework 15
1. Assessing Direct Expenditures by Fishing Vessels 15
Vessel Expenditure Surveys 15
Expenditure Scenarios 17
Expenditures for Fuel Bunkers 17
Composite Estimates for Maximum and Low Impact Scenarios 19
2. Assessing Indirect and Induced Expenditures 20
Background 20
Assumptions Used in Estimating Indirect and Induced Expenditures 22
Local Content of Fuel Bunkers 22
Vessel Provisioning 22
Shore Leave Expenditures for Vessel Crews 22

3. Direct and Indirect Expenditures 22
III: Assessment of the Tuna Industries in American Samoa, Commonwealth of the Northern Mariana Islands, and Guam 23

A. American Samoa 23
B. Guam 26
C. Commonwealth of the Northern Mariana Islands 28

IV: Summary, Conclusions, and Recommendations 30
Evolving Trends in Guam and CNMI Which May Affect the Future of Tuna Operations 33
Evolving Trends in Micronesia Tuna Policy Which May Affect the Tuna Industry in the American Territories 33
Changes in US Policies and the Future of Tuna Operations in US Territories and Commonwealths 35

Appendix: American Samoa Government Estimates of the Impact of a Reduction in Production and Closing of StarKist Samoa 37

List of Tables

Table 1 FSM Airfreight Shipments of Fresh Fish by Port 4
Table 2 FSM Port Calls by Longliner Vessels 5
Table 3 RMI Fresh Tuna Exports Port Calls and Catch Data 8
Table 4 Fresh Tuna Exports from Palau to Japan 10
Table 5 Port Calls by Fishing Vessel Type - Guam for 1994 15
Table 6 Port Calls by Fishing Vessel Type - American Samoa for 1994 15
Table 7 Surveys of Purse Seiner Expenditures in Guam and American Samoa 16
Table 8 Surveys of Longliner Expenditures in Guam and American Samoa 16
Table 9 Maximum and Low Scenario Estimates for Vessel Expenditures 17
Table 10 Direct Shore Expenditures in Guam for 1994 20
Table 11 Direct Shore Expenditures in American Samoa for 1994 20
Table 12 Indirect and Induced Multipliers Used in the Study 21
Table 13 Results of Analysis: Direct and Indirect Expenditures by Tuna Vessels in 1994 23
Table 14 Fish supply to the American Samoa Canneries 24
Table 15 Fish Supply from "Z" vessels 25
Table 16 Guam Longliner Port Calls 27
Table 17 Tuna Volume and Vessel Calls at Tinian Transshipment Port 28
Table 18 Tuna Transshipment through Saipan Airport 30
Table 19 Assessment of Cannery Reduction/ Closure on the American Samoa Economy 37

Preface

A great many individuals and organizations contributed to the completion of this report. At the risk of not acknowledging everyone, we would like to thank those who provided information, insights, encouragement, and support for the study and writing of this report.

In Hawaii, we would like to thank John Sibert of the Pelagic Fisheries Program at SOEST and the JIMAR staff; Kitty Simonds and Bob Schroeder of the Western Pacific Regional Fishery Management Council; Sam Pooley of the National Marine Fisheries Service Honolulu Laboratory; Paul Bartram of Akala Products; Bob Harman; John Harms, formerly with BHP Petroleum; Bunny Loman; Ping Sun Leung of the Department of Agricultural Economics, University of Hawaii; Craig Severance of the University of Hawaii at Hilo; and Jerry Norris, Executive Director of the Pacific Basin Development Council.

In American Samoa, we would like to thank Vai Saliga and Alex Zodiacal of the Economic Development and Planning Office in American Samoa; Aleni Ripine, Susan Yakutis, Rene Clemens and Christine Lutu of the Governor's Office; Alfonso Pete Galea`i, former Director of the Economic Development and Planning Office and now on the Samoa Packing staff; Ray Pritt, Treasurer's Office; Ray Tulafono of the Department of Marine and Wildlife Resources in American Samoa; Abe Malae of the American Samoa Power Authority; Vince Haleck and the staff of Purse Seiner Services; Pat Letuli of Mother of Pearl Enterprises; Skip Walker of Southwest Marine; Paul Stevenson and Will Sword of BHP Samoa; Barry Mills of StarKist Samoa; Mike McReedy, former General Manager of Samoa Packing; and Mr. Chiu of FCF.

In Guam, we would like to thank Dot Harris of the Department of Commerce; Bill Fitzgerald, formerly of that department; Michael Cruz, former Deputy Director of the Bureau of Planning; Frank Santos, Harbor Master, Port of Guam; Franklin Leon Guerrero of the Port Authority of Guam; Pedro Leon Guerrero, former Director of the Port Authority of Guam; David Tydinco, former Director of the Port Authority of Guam; Ray Carter of Cassamar Guam; and Terry Debort of Northwest Orient Airlines.

In the Commonwealth of the Northern Mariana Islands, we would like to thank Benigno Sablan and Richard Semens of the Department of Natural Resources; Nick Strauss formerly with the Governor's Office; Jose I. Guererro of the Port Authority; and the Managing Director of Pacific Orient International.

We would also like to thank Tony Kingston of the Forum Fisheries Agency; Danny Wase, Director of the Ministry of Resources and Development in the Republic of the Marshall Islands; Theo Isdamu, Chief, Division of Marine Fisheries in the Republic of Palau; Marcelino Melairei, Minister of Resources and Development, Republic of Palau; Sebastian Anefal, Secretary of the Department of Resources and Development, Federated States of Micronesia (FSM); Mathew Yamada, Manager, Statistics, Licensing and

Statistics Branch in the Federated States of Micronesia; Eugene Pangelinan, Deputy Director of the Micronesian Maritime Authority; and Peter Setan, President and CEO of the National Fishing Corporation of the FSM.

Sincere thanks to all for your cooperation and assistance.

The research on which this report is based was supported by the Pelagic Fisheries Research Program, School of Ocean and Earth Science and Technology, University of Hawaii with a grant (NA37RJ0199) from the National Marine Fisheries Service, National Ocean and Atmospheric Administration, US Department of Commerce. The views expressed in this report are entirely those of the authors and do not reflect those of the University of Hawaii, the US Department of Commerce, NOAA, or any of its subdivisions.

Introduction

The tuna industries in American Samoa, Commonwealth of the Northern Mariana Islands, and Guam have been in a state of flux since this study was initiated in 1993. The purpose of this report is to assess the contribution of tuna fishing, transshipment, and processing to the economies of these island jurisdictions. Unfortunately, the pace of change of existing tuna transshipping, home porting, and processing operations in the American Flag Pacific Islands has been much more rapid than the pace at which quantitative data could be gathered and analyzed. Moreover, requests for short-term assistance by the three governments on urgent policy questions delayed the completion of this report far beyond the original project schedule. As a result, most of the quantitative data on tuna operations in the three jurisdictions are for the years 1993 and 1994. Nevertheless, this report is offered to the governments of American Samoa, Commonwealth of the Northern Mariana Islands, and Guam and to the Western Pacific Fishery Management Council in the hope that it will provide (1) a fairly comprehensive assessment of the 1994 contribution of tuna industries to the three economies, and (2) a much more extensive but less quantitative assessment of major trends in the industries that are already having an impact on tuna operations in the US Pacific territories and commonwealth.

This report has four sections. The first section contains an overview of trends that have affected the contribution of tuna operations in American Samoa, Commonwealth of the Northern Marianas and Guam since the early 1990s. Section two provides a detailed quantitative analysis of tuna operations in the sea ports of American Samoa and Guam in 1994.[1] The third section describes the contribution of tuna operations to the economies of the three jurisdictions. For American Samoa, the fleet expenditure results from section two are supplemented in the appendix by estimates of the direct contribution of the canneries to the economy of the territory. For Guam, the results of the quantitative fleet expenditure analysis and the benefits of transshipment of sashimi grade tuna through Guam's airport are discussed. For the Commonwealth of the Northern Marianas, the contribution of the Tinian cannery-bound tuna transshipment to the local economy is described along with the contribution of a sashimi-grade tuna transshipment operation through Saipan's international airport. The final section contains a summary, conclusions and recommendations, some of which are already being implemented as a result of discussion between the project team and the governments of American Samoa, Commonwealth of the Northern Mariana Islands, and Guam.

Historical Background

Tuna processing, transshipment, and home-porting industries have developed in American Samoa, Commonwealth of the Northern Mariana Islands (CNMI), and Guam

[1] A similar analysis was not conducted for Tinian in the Commonwealth of the Northern Mariana Islands because shore expenditures by seiners calling at Tinian were very limited compared to those in American Samoa and Guam and detailed expenditure information was not available.

because each provided a comparative advantage over other locations in the region. These advantages have included geographic location relative to the fishing grounds, shipping routes, processing plants, and markets; the cost and availability of fuel and other goods and services to support the tuna operations; tariff free market access to the US; and significant tax incentives.

American Samoa, Commonwealth of the Northern Mariana Islands, and Guam have significantly different niches in the global tuna industry. Van Camp Seafood's established its processing operation in American Samoa in 1954 to take advantage of two statutory provisions in US law. The first is the exemption of the territory from the Nicolson Act which prohibits the landing of fish by foreign flagged fishing vessels in US ports. The second was Headnote 3(a) of the US Tariff Schedule which gave products from US territories duty-free status if the foreign component of the product is less than 50% of the market value. In 1963, StarKist Seafoods established a second cannery.[2] Since that time, the canneries have expanded their capacity and serviced a growing number of longline and purse seine tuna vessels. With the expansion of the fleets, provisioning and vessel and gear repair services have developed that contribute significantly to the American Samoa economy.

In the Commonwealth of the Northern Marianas, tuna operations began with no processing operations, shore facilities, or fuel or provisioning services. Tinian became a transshipment center for cannery-grade frozen tuna in the early 1980s with fishing vessels off-loading directly on to reefer vessels bound for American Samoa, Puerto Rico, and Asian processing centers. Limited shore facilities were developed and the use of Tinian gradually expanded until the early 1990s. In 1991, a different tuna transshipment operation was established on Saipan. This operation transshipped fresh (sashimi-grade) tuna caught in the Federated States of Micronesia from air freighters to wide-body jets bound for Japan.

Guam's tuna industry developed in the mid 1980s. Longline tuna boats off-loaded sashimi grade tuna in the port of Guam at Apra Harbor. The fish were graded and packed, and loaded on to wide-body jets bound for Japan. By 1990, Apra harbor was home port to over three hundred tuna vessels including both (sashimi-grade) longliners and purse seine vessels, which transshipped frozen fish through Tinian. In 1991, an air-transshipment operation was also established in Guam with sashimi-grade tuna flown into Guam from the Micronesian fishing grounds on air cargo freighters and out of Guam to the Japanese market on wide-body passenger planes. The presence of both longliners and seiner vessels provided a demand for a range of provisioning, vessel maintenance, and gear repair services. These services have gradually developed as vessel demand has increased.

---

[2] D.M. Schug and A.P. Galea`i. "American Samoa: The Tuna Industry and the Economy." In D.J. Doulman, (ed.), *Tuna Issues and Perspectives in the Pacific Islands Region*. Honolulu: East-West Center, pp. 191-202, 1987.

Changes in the policies of neighboring governments, fishing activity, transshipment patterns, markets, global trade arrangements, and US government policies have posed threats to the future viability of tuna operations in all three jurisdictions. They are, therefore, of vital interest to the territorial and commonwealth governments and to the Western Pacific Fishery Management Council. These changes are discussed in the next section of this report.

I: Industry Trends Affecting Tuna Operations in American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam

A. Overview

As already indicated, the Western Pacific commercial tuna fishery is in a period of considerable transition. In the Central Pacific region (including Guam and Saipan) the driving forces behind this transition are (1) the increase in longline fishing activity in the Republic of the Marshall Islands, the Federated States of Micronesia, Palau and other parts of the Pacific Islands region, and (2) the increasingly assertive policies adopted by Pacific Island nations in their licensing of foreign fishing boats. Licensing conditions which require that fish caught within a nation's exclusive economic zone (EEZ) be "landed," transshipped, or discharged in the host country are of particular importance. Such requirements have had their strongest impact on the shore-basing patterns of longline tuna vessels serving the sashimi market in Japan. In combination, these two trends are having a substantial impact on tuna related support activities in Guam and CNMI.

The situation in American Samoa is potentially subject to the same shore basing influences, but it is also affected by continued pressure to decrease the cost of tuna processing. The loss of tax benefits now enjoyed by the American Samoa canneries under Section 936 of the US Internal Revenue Act could significantly increase the "costs" of processing tuna in American Samoa. This is the greatest threat to the viability of the American Samoa canneries in the near term. In the long term, the formation of the North American Free Trade Agreement (NAFTA) may eventually result in duty-free imports of Mexican canned tuna to the American market. Similarly, the recently concluded GATT negotiations–although not directly focusing on barriers to canned tuna trade–clearly established a framework which will make it increasingly difficult to maintain tariff protection for the American Samoan packers. These trends further compound the declining competitiveness of the canneries in Samoa, which have been under increasing cost pressure from foreign competition, primarily tuna canneries in Thailand.

While it will likely take 5 to 10 years for these recent trends to completely work themselves out, it is reasonably clear that, unless the US territories and commonwealth can successfully mount defensive measures, the economic importance of home porting, transshipping and processing will decline substantially. Ironically, even though a decline in the importance of tuna operations in the territories seems probable, it is unclear whether this decline will be offset by a corresponding increase in tuna benefits to other

(independent) island states. Instead, it appears that a combination of technology and the intervention of multinational corporations will capture a substantial fraction of fishing "rents" and benefits for distant water fishing nations (DWFNs) at the expense of the overall islands region.

B. New Transshipment Patterns

Beginning in the late 1980s Pacific island nations adjacent to the primary equatorial fishing grounds took an increasingly aggressive position toward the landing of fish caught in their exclusive economic zones. These positions were expressed as licensing conditions issued under access agreements and are best illustrated by the strategies adopted by the two nations with the most at stake in the Western Pacific tuna industry: The Federated States of Micronesia and Papua New Guinea.

Land-Fish-Locally Policy

Almost since the signing of the Compact of Free Association with the United States in the mid-1980s, the Federated States of Micronesia (FSM) has recognized that the nation's development was closely linked to its marine resources and, in particular, with its abundant tuna fishery. In spite of this early recognition and numerous abortive development schemes, competition between the various FSM states prevented development of an effective tuna development policy until the early 1990s. However, beginning in late 1991, FSM's fishing strategy became focused on the provision of shore facilities and services. To support this strategy FSM made the "local landing of tuna" a condition of fishing licenses for longline tuna vessels. In addition to its development implications for the FSM states, the policy makes good economic sense for fishermen who realize a higher price in FSM and more time actually fishing.[3]

The immediate impact of the license conditions was reflected by the growing number of tuna longliners landing fresh fish in the various FSM ports. Tables 1 and 2 present statistics on the fresh fish and vessel port calls at each of the FSM states.

Table 1
Federated States of Micronesia
Airfreight Shipments of Fresh Fish by Port (kg)

Year	Kosrae	Pohnpei	Chuuk	Yap	Total
1991		272,242			272,242
1992		762,321	1,313,995		2,076,316
1993		564,627	1,131,888	1,316,559	3,013,074
1994	1,360,610	3,125,398	2,712,942	1,259,248	8,458,198
1995	1,086,707	3,394,123	1,962,540	1,099,064	7,542,434

Source: Micronesian Maritime Authority

[3] Knowledgeable sources suggest that fresh fish prices in FSM are $2-3/kg higher than in Guam and that longliners save 4-5 days by off-loading in FSM rather than traveling to Guam.

Table 2
Federated States of Micronesia
Port Calls by Longliner Vessels

Year	Kosrae	Pohnpei	Chuuk	Yap	Total
1991		82			82
1992		157	n/a	359	516
1993		184	90	592	866
1994	87	1,367	207	705	2,366
1995	85	2,107	192	413	2,797

Source: Micronesian Maritime Authority

The data in Tables 1 and 2 dramatically show the rapid increase in chilled tuna exports transported through FSM. Between 1991 and 1995 transshipped exports increased by a factor of 27, while vessel port calls by longliners increased a staggering 34 times. By any measure, the land locally policy was an incredible success, at least in terms of transshipment activity in FSM.

The tables also suggest the pattern by which the implementation of the land locally policy was facilitated by Ting Hong Enterprises and other operators. Initial transshipment moved from the well established infrastructure at Pohnpei and Chuuk to the lesser developed states of Yap and Kosrae. Prior to the 1991 change in policy in FSM, most of the sashimi longliners operating in the North Pacific transshipped their fish through Guam's Apra harbor where they would take on supplies of fresh food, fuel, and bait for their return to the fishing grounds.

Looking forward, the Micronesian Maritime Agency believes that the current growth of the FSM sashimi export will continue to grow over the next few years. Current expectations are for growth in chilled tuna exports to average 10-15,000 tons/year.

Restrictions on Mother Ship Operations

One intention of the land-fish-locally policy was clearly to create shore-based activities related to fishing vessel supply. Supply targets included fuel supply and foodstuffs for longline boats fishing for cannery-grade tuna. Prior to 1991, much of this fuel and provisioning activity had been done through the operation of mother ships which exchanged vessel supplies for frozen fish. While the land-fish-locally policy effectively eliminated the transfer of fish, the mother ships have continued to supply food and fuel to the fishing vessels, thus limiting the scope for locally provided goods and services. They have done this largely by provisioning vessels in FSM harbors rather than on the high seas. A major factor in the continuing economic advantage of mother ship operations is the substantial price differential between fuel purchased from mother ships and fuel purchased from shore installations in the FSM and the limited ability of local suppliers to meet vessel provisioning needs.

Emergence of Air Transshipment Hubs in Guam and Saipan

In 1991, an emerging pattern of transshipment through both Guam and Saipan for tuna bound for the Japanese sashimi market accompanied imposition of the land-fish-locally policy. Shore bases in FSM and Palau began transporting sashimi-grade tuna by smaller cargo jets to Guam and Saipan where shipments were consolidated for transshipment onto jumbo jets bound for Japan. In 1993, there were four operators transshipping through Guam and Saipan, the largest being Ting Hong Enterprises, a Taiwanese corporation which maintains two Boeing 727 cargo planes in Saipan. The development of this transshipment pattern was clearly a response by Ting Hong and other business people to an opportunity driven by an expanding market in Japan for fresh fish of the varieties caught in Micronesia.

The volumes of fish being flown through Guam and Saipan are substantial, but, as discussed below, the contribution of these operations to the local economy are minimal. In 1993, an estimated 80 metric tons (mt) per week was being transshipped through Saipan during the "high season" (May, June, July, and August) with about 30 mt per week being transshipped during the "off season."

The volumes of fish flown into and out of Guam and the contribution of the air transshipment to the Guam economy are much harder to track than for Saipan. In 1991, air cargo capacity to Guam was approximately 80 mt per day, approximately 55% of which was on the desirable overnight flights into Narita, Osaka, and Nagoya.[4] In 1991, the volume of fish transshipped through the port of Guam totaled 12,583.97 mt and monthly volumes ranged from a low of 400 mt in October to a high of about 1100 and 1400 mt in April and May respectively. During that year, airlines report that about 95% of the fish transshipped in Guam came through the sea port with the remainder coming in on chartered jet freighters. In 1992, the total volume of fish coming out of Apra Harbor declined to about 5390 mt but by 1993 had increased to 7104 mt. However, of more interest is the fact that by 1993 fish landed at Apra Harbor constituted less than 65% of the total fish being flown to Japan.[5] In 1995, a new company began flying tuna into Guam from Indonesia which has reportedly displaced 20% to 30% of the air cargo space to Japan from Guam.[6] The problem for Guam is that the tuna being flown into and out of Guam generates little additional employment or purchases of goods and services–with the exception of landing fees and jet fuel purchases.

Frozen Tuna Transshipment in Guam and Potentially FSM

In March 1995, Casamar, a Guam vessel maintenance company, began shipping frozen seiner tuna to Bangkok using American President Line (APL) refrigerated containers.

---

[4] Bartram, P.K., J. Bourland, P.D. Gates, J.J. Kaneko and O. Seth. Study of the Longline Fishery in Guam: Assessment of the Market and Economic Impacts. Guam: Department of Commerce, 1991.

[5] Based on airline estimates.

[6] Minutes of the Guam Ad Hoc Committee on Fisheries 1995, February 3, 1995

During 1995, the Casamar/APL operation shipped over 28,000 tons of tuna to Thai packers. Reportedly, Casamar/APL have the capacity to eventually transship up to 100,000 tons a year of frozen tuna.

The refrigerated container operation is attractive for many reasons. First, it is considerably cheaper than shipping by reefer vessel. Current price quotes suggest that container shipment is almost 35% cheaper than transport by conventional reefer vessels. Second, from the packers' viewpoint, the 25-ton containers are much more easily managed and integrated with locally procured fish than an entire reefer vessel of frozen tuna. Third, from the APL perspective the back haul of refrigerated containers to prime Asian shipping markets is a windfall since these containers might otherwise have to be transported empty. As with many shore based operations, the value added in Guam is modest and restricted mainly to stevedoring of the fish and to the profit generated for Casamar/APL. However, the flow-on effect of ensuring high levels of purse seiner calls in the Port of Guam is potentially important to Guam businesses serving the industry.

Casamar is currently considering expanding their transshipment activities to Chuuk State in FSM. While Chuuk lacks the availability of empty refrigerated containers that Guam enjoys, there may be an opportunity for direct transport of frozen tuna (in containers) to the canneries in American Samoa. At least one shipping line has expressed an interest in further studying this possibility. Should a significant transshipment operation be started in FSM the likely loser would be Pago Pago harbor in American Samoa, since purse seiners could unload closer to the fishing grounds. As a consequence, fewer vessels would make the trip to Samoa and vessel expenditures in Pago Pago would potentially be reduced. The hardest hit sector in American Samoa would, in all likelihood, be bunker fuel sales and resultant excise tax receipts to the American Samoan government. Bunker fuel sales have already been sharply reduced as a consequence of offshore refueling of the tuna fleet associated with StarKist Seafoods and H.J. Heinz.[7] The operation of the marine railway and the viability of the Southwest Marine shipyard and other businesses providing goods and services to the fleet might also be affected.

A second Guam transshipment operation, which started in March 1995, is removing heads and guts from longline caught fish that do not meet Japanese sashimi market requirements, then air freighting them to Europe via Korea. While the potential contribution of this operation to the Guam economy is small, it may serve to further diversify the tuna transshipment industry in Guam and to provide an additional inducement to longliners to call at Apra harbor.

---

[7] Fuel bunkers transferred offshore from a tanker vessel, which began supplying fuel to purse seiners in mid-1995, are reportedly US 16-17 cents cheaper than bunkers purchased in Pago Pago. Fuel sales in Pago Pago harbor reportedly began dropping off in June 1995. This was reportedly a response to an increase in taxes and fees from 8.73 cents to 10.73 cents. According to American Samoa government officials, the off-shore bunkers have expanded beyond the boats associated with StarKist. Combined with the decline in fuel sales, almost $70,000 per month in excise tax revenues and fees to the government of American Samoa could be lost (*Samoa News*, March 20, 1996). Pago Pago fuel prices are expected to be brought down in July 1996 when the expansion of the fuel tank farm will be completed.

Tuna Transshipment in the Marshall Islands

Majuro. In February 1995, the Marshall Islands government bought out the interest of two Hawaii business men, Larry Mehau and Frank Goto, that had been operating the transshipment operation in Majuro since the early 1990s. Initially, the Majuro operation was transshipping tuna caught by a local fleet of twelve boats, organized by the Mehau-Goto operation. These fish were being flown on the Airline of the Marshall Islands (AMI) to Hawaii and on to Japan, and MMAGG (as the Mehau–Goto company was known) had plans to expand their operation to 150 boats. In 1993, twelve Chinese boats began home porting in Majuro and transshipping through MMAGG. By June 1994, the number of Chinese boats had increased to nearly 40,[8] and considerable controversy had developed in the Marshalls about the impact of the Chinese boats on the catch of the local fleet. Although reportedly losing money for MMAGG, the tuna export base at Majuro continued to grow. Table 3 below presents data on fresh fish exports through Majuro.

Table 3
RMI Fresh Tuna Exports
Port Calls and Catch Data

Year	Fresh Tuna Exports (mt)
1990	8,570
1991	6,240
1992	8,632
1993	10,738
1994	10,414

Note : Fresh Tuna Exports refer to Bigeye and Yellowfin

In October 1994, the Government negotiated with Ting Hong Enterprises and Larry Mehau to allow Ting Hong to take over the transshipment operation on a 20 year lease arrangement.[9] The long-term impact of this change in control over tuna exports on fresh fish transshipment through Guam and Saipan is not yet clear. In theory, Ting Hong could use its own aircraft to fly fish into Guam and Saipan and use the air links to Japan already established. However, thus far, Ting Hong has chosen to continue to rely on AMI's Hawaii connection to move fresh fish to Japan. This choice no doubt reflects considerable pressure to continue to use the Airline of the Marshall Islands (which is heavily dependent on fresh fish shipment revenues) and the much greater cargo capacity available on the Honolulu-Japan route.

Enewetak Atoll. As previously noted, management of the longliner base in Majuro has been transferred from Hawaii interests to Ting Hong Enterprises. In parallel with assuming responsibility for the Majuro base, Ting Hong held discussions with Marshall Island officials on development of a new longliner shore facility on Enewetak Atoll. The discussions called for the Marshall Island government to extend the airfield on Enewetak and for Ting Hong to rehabilitate old army facilities and fuel storage tanks. Subsequently,

[8] *Pacific Magazine*, July/August 1994
[9] *Marshall Island Journal*, February 24, 1995

the Marshall Islands government approached the Asian Development Bank about finance for the project. While not rejecting the proposal, the ADB reportedly put the project on hold pending completion of a comprehensive fishing strategy consultancy for RMI.

A new longliner base at Enewetak might increase the supply of transshipped fresh fish through Guam/Saipan. Currently, most of the Marshalls catch is air freighted to Honolulu and Japan on the national airline, Air Marshall Islands. Without a detailed assessment of vessel logs it is impossible to determine whether vessels licensed to fish in the Marshalls (or northern FSM) would be better served by an Enewetak base. However, it is interesting to note that the Entewetak proponent, Ting Hong (as agent for the Taiwanese and Chinese longliners fishing in the region), is in the best position to assess the value of such a new shore base.

Exports from Palau

At least one of the longline tuna export operations in Palau sharply curtailed operations as a result of the imposition of an export tax on fresh fish. According to Palauan diplomats interviewed in April and May of 1995, the two fishing companies operating in Palau, which were landing fish in Koror, told the government they could no longer operate economically with the new tax. As a result, boats licensed to fish in Palau's waters are landing their catch in Guam.

Of all the Micronesian countries, Palau clearly has the greatest tourist potential. This tourist potential translates directly into air cargo capacity. Palau sees tourism as the backbone of its future economic growth and is devoting considerable resources to developing this sector. With the opening of the new Outrigger Hotel, Palau will have more hotel rooms than either FSM or the Marshalls. The next logical step in Palau's tourist strategy is to directly tap the Japanese and other Asian tourist markets through nonstop air links. In late 1995 and early 1996, discussions were held with both JAL and Continental Micronesia regarding the start of scheduled nonstop flights between Japan and Palau. While the current dialogue may not produce immediate results, the question of direct airlines to Japan seems more a question of "when" rather than "if." A direct air connection to the fresh fish markets of Japan has interesting regional implications. First, the need to transship tuna destined for the Japanese sashimi market from Palau and possibly Yap, through Guam/Saipan would clearly be reduced (possibly even eliminated). Second, the quality and resultant value of Palau's sashimi exports would tend to rise since transfer and holding times would be reduced. Table 4 presents data on Palau's fresh fish exports for recent years.

Table 4
Fresh Tuna Exports from Palau to Japan

Year	Volume (mt)	Value
1992	4,043	$32,374,000
1993	3,872	$31,041,000
1994	2,000	$18,236,000

Source: UN Commodity Trade Statistics: Japanese Import Statistics for SITC Code 034

Clearly, fresh tuna exports of this volume might easily be handled as cargo on the Boeing 727-200 aircraft which currently serve the Palau airport. However, Palau has long contemplated a longer-term tourist trade which warrants expanding the existing airport facilities and runways to accommodate wide-bodied aircraft of much greater passenger (and airfreight!) capacity. Such an expansion could make Palau a significant new player in the Guam/Saipan fresh fish forwarding business. For Guam and Saipan, the direct shipment of the Palau and Yap longline catch would tend to free up fish transshipment capacity during the peak fishing season and might result in a marginal increase in the quality of fish exports.

Future Airlift Capacity from Guam

In December of 1996, the Governor of Guam announced an ambitious development strategy for the island. This strategy, known as Vision 2001, encompasses targets and strategies for a number of sectors including tourism and fisheries. A strategy to double tourism arrivals by 2001 is of particular importance. To achieve this goal, major upgrading of infrastructure (including Guam international airport and harbor) is planned. In addition to the direct impact of expanded infrastructure, an important by-product of this tourist expansion will be increased air freight capacity for handling fresh fish exports to major Asian markets. To the degree that the Micronesian longline tuna fishery can maintain higher sustainable tuna catch rates and the Japanese markets do not become saturated with fresh fish, Guam's Vision 2001 would seem to ensure that expanding airlift capacity for handling fresh fish is available through Guam.

Baitfish Aquaculture Operation on Guam

One of Guam's largest aquaculture farms was contracted to supply live milkfish to a Taiwanese longliner agent at the beginning of 1995. Because milkfish have been shown to yield tuna catch rates of three to five times those of dead bait–and the alternative is purchasing live bait in Taiwan–interest in developing bait fish aquaculture is continuing to grow.

Using longliner port calls as a basis, a study by the Guam Commerce Department estimated that 1995 bait sales of milkfish would have been between $11.4 and 13 million annually. If a baitfish venture of this magnitude could be successfully established and sustained, it would represent a very substantial step toward increasing the local content of

the tuna harvesting in the Pacific territories and would effectively ensure Guam's future as a longline port. [10]

C. New Fish Processing Operations in Papua New Guinea

Farther to the south, Papua New Guinea adopted a somewhat different strategy for capturing a larger fraction of the value added from tuna harvesting. Through their association with the European Community (EC)–via the Lome convention–PNG enjoys duty-free access to fast growing markets for packed tuna in Europe. This preferential access led PNG to adopt a strategy designed to link fishing rights in a prime fishing grounds (the Margado Square) to establishment of a tuna cannery in the country. This opportunity was first recognized by a major tuna fleet operator from Guam and CNMI, Lawrence Zuanich.

Beginning in 1991 Zuanich entered into protracted negotiations with PNG officials to establish a tuna cannery at Madang on the north coast of New Guinea's main island. Agreement in principle was reached in these negotiations in late 1992-early 1993, and Zuanich reportedly broke ground for a 200 ton/day cannery at Madang. Under the PNG arrangements Zuanich had the exclusive right to supply the cannery with fish from his fleet of 12 purse seiners. One source places the capacity of the Zuanich fleet at 100,000 tons/year which is over twice the projected requirements of the planned Madang cannery. Against the possibility of excess supply at Madang, the cannery agreement contained provision for a PNG transshipment facility. Tuna from the Zuanich vessels might be transshipped from Madang to existing processing centers in American Samoa or Thailand. Historically, the Zuanich vessels have been home-ported in Guam and, even though some of their requirements might continue to be met there, re-deployment to PNG could represent a substantial cutback in the territory's purse seiner repair and provisioning business.[11] It is important to see the potential effects of Madang transshipment within the context of the recently developed Casamar/APL transshipment venture in Guam.

As part of the cannery agreement, the PNG government was asked to grant the Zuanich vessels the sole rights[12] to fish in the Morgado Square area of PNG. Access to this area has been restricted by PNG and, although the area has been promoted as one of the most promising undeveloped fisheries in the Western Pacific, its true potential has not been fully assessed. Since the Zuanich vessels would have the exclusive right to supply the Madang cannery from a hitherto underdeveloped (Morgado) fishery, a potential consequence of the Zuanich agreement might conceivably be a re-deployment of fish harvesting capacity (and shore support facilities) from American Samoa and Guam to PNG.

---

[10] Department of Commerce, Government of Guam. Tuna Bait Project to Supply Tuna Longline Vessels: Potential for Aquaculture Bait on Guam. Department of Commerce, n.d.

[11] In parallel with Zuanich's initiative at Madang, StarKist Seafoods (the largest tuna packer in American Samoa) indicated a similar interest in a tuna cannery site in the New Guinea islands at either New Ireland or New Britain. Following extensive site surveys and preliminary discussions with the PNG government, StarKist's New Guinea project was quietly shelved.

[12] Provision exists for fishing by Papua New Guinea vessels and for traditional fishing purposes.

In April 1995, reliable sources reported that the Zuanich cannery project was in limbo. This was due to uncertainties over whether the PNG operations would, in fact, qualify for duty free access into the European Community. A month later, the South Seas Digest reported that RD Tuna Ventures of the Philippines was discussing a second cannery for Papua New Guinea.[13] The Digest made no mention of the Zuanich cannery project being shelved and stated that the venture would be a "second cannery" for PNG. While this new cannery, assuming it is built, would not directly affect the "Z" boat fleet, it could divert boats away from the canneries in American Samoa and introduce a new element of foreign competition for StarKist-Samoa and Samoa Packing. On the other hand, with PNG wage rates considerably above wage rates in Asia, the competitive advantage of a PNG cannery is not necessarily assured.

D. Changes in US Policy of Potential Importance to Tuna Operations in the Territories

The Evolving Economics of Tuna Packing in American Samoa

The past few years have been particularly tumultuous for the American Samoan packing industry. This period has been characterized by three major forces. First, the industry has had to face ever stiffer foreign competition for tuna packed in southeast Asia, particularly Thailand. Second, internal corporate realignments and ownership have forced the Samoan industry to adapt to changing cost and profit expectations. Third, the deteriorating financial position of the American Samoan government has meant that there is little, if any, scope for fiscal assistance or flexibility from the public sector.

The interplay of these forces has meant that the traditional comparative advantage of Samoan tuna processing operations has been partially eroded. In turn, this deterioration has led to increasingly strained relations between the American Samoa Government and the canneries and has prompted threats of closure on the part of Starkist-Samoa. Since a more detailed assessment of the contribution of the canneries and a chronology of recent development is included in the appendix, there is little purpose in going into detail here. However, it is important to highlight the rather obvious importance of the canneries to the tuna harvesting industry which is the object of the study. In a nutshell, without the tuna canneries there simply is little justification for a tuna harvesting industry in American Samoa. With limited tuna resources and a geographic position which is remote from both the primary Western Pacific fishing grounds and the lucrative Asian fresh fish markets, the island is peripheral to the Pacific tuna industry...without the canneries. To compound its current situation, tuna processing in American Samoa is subject to the much larger forces of American foreign and domestic policy. These forces are largely beyond the control or influence of either the territorial government or the canneries

[13] *South Seas Digest*, May 5, 1995.

themselves. Of particular importance to the future of tuna packing in American Samoa are two current policy initiatives of the U.S. government:

- Proposed changes in the tax treatment of US companies operating in US territories; and
- American trade policies as articulated in the GATT and NAFTA agreements.

While the precise impact of these trends is far from certain, it is clear that both factors represent substantial long-term challenges to the comparative advantage and continued viability of tuna processing in American Samoa.

Amendments to the Magnuson Act

In 1995, amendments were proposed to the Magnuson Fisheries Conservation and Management Act which has been a centerpiece of American tuna policy for several decades. The proposed amendments would regulate foreign fishing in the EEZ of the Pacific insular areas while recognizing the customary fishing rights of the indigenous people of the territories. The effect of the amendments would be to give the territorial governments a much greater voice in the development of policies governing the management of the 200 mile EEZ which surround their islands and open the possibility that some of the fishing fees collected from foreign fishing fleets would return to territorial treasuries. Because the three insular areas are not generally considered to have primary or under-exploited tuna fisheries, the direct financial effect of the amendments would probably be limited. However, the governments of the insular areas believe that the exercise of regulatory powers in the EEZs may enable them to participate more fully in interaction with the Forum Fisheries Agency. Such participation is viewed as advantageous in harmonizing fisheries regulatory policy

II. Fishing Vessel Expenditures in American Samoa and Guam

This section contains an analysis of fishing vessel expenditures in American Samoa and Guam for 1994. As stated in the introduction, vessel expenditures represent only a portion of the contribution tuna operations make to the economies of American Samoa and Guam. However, they represent a relatively large portion and are difficult to quantify. Therefore, a detailed analysis of vessel expenditures is presented here. The results of the analysis presented in this section of the report are combined with an analysis of other elements of the industry in the discussion of the contribution of tuna operations in each of the three jurisdictions in section III, below.

A. Elements in the Study

Direct and Support Expenditures

Any assessment of the impact of a particular economic activity must start with the direct expenditure patterns associated with that activity. In the case of the present study, this

primarily involves vessel expenditures on supplies and services, crew R&R expenditures, and infrastructure fees during port visits. The major direct vessel expenditures considered in the study were the following:

ship fueling
crew shore leave expenditures
ship provisioning
air freight forwarding and ground services
fish handling
cold storage and reefer operations
port and other infrastructure fees
salt/ice purchases

In addition, certain expenses may not be directly associated with vessel purchases but are reflected in the costs of local support firms. Without these support expenditures, there would be no reason for the vessels to land the fish. In the case of American Samoa, the scope of the study was expanded to include the economic impact of the tuna canneries (see Appendix) and its critical importance to the territory's tuna-based economy. Our guiding premise for American Samoa was that without the canneries the fishing boats would simply not come and the direct vessel expenditures would not be incurred.[14]

Fishing Vessel Port Calls

Using port records, the number and type of fishing vessels calling at each of the two locations was initially reconstructed for 1993. Subsequently, times series data were gathered for earlier and later years and for 1994. Port calls were recorded for purse seiners, longliners, and fish carriers/reefer vessels.[15] Port calls were counted whether or not a vessel actually discharged fish. Therefore, port calls made for trip staging/mobilizing, repairs, and transit stops en route to the fishing grounds were included. While there may be some slight differences in expenditure patterns between "fish unloading" vessels and "other" vessels, such differences were considered to be negligible for the purposes of the study.[16] Longliner and seiner port calls for each of the study areas are presented in Tables 5 and 6

[14] The physical size and operating costs of both purse seiners and longliners vary considerably. The major expenditure areas affected by vessel differences are the crew size (e.g., provisioning requirement/ R&R expenditures) and fuel expenditures. No attempt was made in this study to differentiate vessel expenditure characteristics by flag.

[15] While this study focused primarily on vessels fishing for yellowfin, skipjack, and bigeye tuna the American Samoan data also included a considerable albacore catch destined for the canneries.

[16] Differences might, for example, relate to crew R&R expenditures associated with shorter port visit times. On the other hand, provisioning and refueling patterns probably were not significantly different for vessels preparing to depart for the fishing grounds.

Table 5
Port Calls by Fishing Vessel Type-Guam for 1994

Year	Seiners						Longliners				
	US	Japan	Korea	Taiwan	Other	Total	Japan	Korea	Taiwan	Other	Total
1992	71	16	60	40	31	214	718	339	89	3	1146
1993	71	13	91	64	18	257	316	565	4	7	892
1994	63	16	45	68	9	201	569	623	5	9	1197
1995	14	2	17	14	0	*	104	2	70	4	*

*Notes: 1995 data include seiner port calls for January and February only and longliner calls from January through July 1995.
Source: Guam Port Authority

Table 6
Port Calls by Fishing Vessel Type-American Samoa for 1994

Year	Longliners	Seiners	Jig Boats	Containers
1990	243	107	84	55
1991	190	129	46	53
1992	181	134	22	92
1993	164	173	47	92
1994	183	225	n/a	n/a

Note: Reefer/container vessels mainly service albacore fleet.
Source: Port and cannery Records

The Secondary and Indirect Impact of Tuna Expenditures

At the onset of the study, we had hoped to develop estimates of the secondary impact from economic, taxation or planning models available in the territorial governments. However, we found that the official statistical base in all three jurisdictions was not suited to this purpose. As a result, we were unable to develop precise estimates of secondary impacts which were directly compatible with existing planning data or models. Nevertheless, we believe that our estimates are indicative of secondary impacts and reflect a reasonable approximation of the importance of tuna related activities.

B. The Analytical Framework and Results

1. Assessing Direct Expenditure by Fishing Vessels

Vessel Expenditure Surveys

A number of vessel expenditure surveys were available to the study for both Guam and American Samoa.[17] Expenditure estimates from these surveys, even though undertaken by creditable organizations, showed substantial variation. Table 7 summarizes purse seiner data for American Samoa and Guam from the major expenditure surveys, while Table 8 presents similar expenditure survey data for longliner vessels.

[17] Tuna fishing and transport vessels (reefers) normally only reprovision in Tinian during loading/unloading operations. An independent estimate of the value of this activity is presented in section III, the assessment of tuna industries by jurisdiction, CNMI.

Table 7
Surveys of Purse Seiner Expenditures in Guam and American Samoa
(US$ thousands)

Expenditure	Guam			American Samoa		Hawaii
	Gov Guam[1]	Atkins Kroll[2]	Carter[3]	ASG[4]	ITC[5]	1200 ton[5]
Fuel	155	200	201	126	155	150
Crew	81	–	43	16	–	25
Food	43	30	80	20	20	25
Misc.	88	–	–	19.2	–	22
Salt	–	3	40	7.2	40	–
Port Charge	–	–	20	3.2	20	–
Trip Cost	364	233	384	191.5	235	222

Notes:

1. Guam Department of Commerce. Guam Large Scale Fisheries Economic Profile 1993. Tamuning Guam 1994.
2. Letter from George L. Jonson, Manager, Steamship Department, Atkins Kroll.
3. Figures provided by Ray Carter, August 1994.
4. Economic Assessment of Purse Seiner and Longliner Contribution to the Local Economy. Prepared by Alex P. Zodiacal, Economic Development and Planning Office, American Samoa Government, December 21, 1994.
5. International Trade Commission. Tuna: Competitive Conditions Affecting the US and European Tuna Industries in the Domestic and Foreign Markets. Washington, DC: US International Trade Commission, December 1990.
6. Department of Business and Economic Development. Hawaii as a Base for Tuna Purse Seining Operations. Honolulu: Department of Business, and Economic Development, June 1985.

Table 8
Surveys of Longliner Expenditures in Guam and American Samoa
(US$ thousands)

Expenditure	Guam		American Samoa	
	Longline Study	Gov Guam	ASG	ASG (2)
Fuel	4	4	73	12.3
Crew	3.5	2.4	4	23
Food	2.4	0.6	20	15
Ice	0.6	0	0.5	–
Misc.	–	–	–	28
Trip Cost	10.5	9.4	108.7	78.5

Sources:

1. Bartram, P.K., J. Bourland, P.D. Gates, J.J. Kaneko, and O. Seth. Study of the Longline Fishery in Guam: Assessment of the Market and Economic Impacts. Tamuning: Department of Commerce, Government of Guam.
2. Guam Department of Commerce. Guam Large Scale Fisheries Economic Profile for 1993. Tamuning, Guam, 1994.
3. Economic Development and Planning Office. Internal Study, 1990.
4. Economic Assessment of Purse Seiner and Longliners' Contribution to the Local Economy. Prepared by Alex P. Zodiacal, Economic Development and Planning Office, American Samoa Government, December 21, 1994.
5. Lucas, L. and R. Iversen. Foreign Flag Fishing Vessel Expenditures in the Port of Honolulu 1986-88. Honolulu: University of Hawaii Seagrant Program, 1992.

Some of the variation between survey estimates is no doubt associated with cost changes between the dates of the surveys. Another significant explanation for survey variation is that each survey presented only "typical" expenditure estimates. These typical expenditure estimates simply averaged different sized and flagged vessels into a single convenient characterization. Most of the surveys explicitly acknowledged this averaging problem but defended the methodology as being expedient and representative, and, indeed, the present study follows this approach. Even though the bottom line total for each estimate shows considerable variation, removal of the estimated expenditures for fuel significantly reduces differences between the estimates. Given the importance of

fuel to expenditure patterns a separate methodology has been adopted for this expense (see below).

Expenditure Scenarios

In view of the considerable differences between the surveys, we decided to develop two impact scenarios. The first scenario assumes *maximum* vessel shore expenditures for each item (e.g. the highest value for each item in Tables 7 and 8). Conversely, the second scenario estimates the lowest expenditure value for each cost item. Table 9 summarizes the values used in the low and high scenarios.

Table 9
Maximum and Low Scenario Estimates for Vessel Expenditures[1]
(US$ thousands)

	Guam				American Samoa			
	Longliners		Seiners		Longliners		Seiners	
Expend	Max	Low	Max	Low	Max	Low	Max	Low
Fuel[2]	10	4	200	120	73	12.5	175	126
Crew	3.5	2.4	81	43	23	4	16	16
Food	2.4	2.4	80	30	20	15	20	20
Misc	–	–	88	2	28	0	19.2	–
Ice/Salt	0.6	0.6	40	3	0.5	0.5	40	7.2
Port	–	–	20	20	–	–	20	3.5
Trip Cost	16.5	9.4	509	218	144.5	32	290.2	172.7

Notes
1. Sources: Tables 7 and 8
2. See Section on Fuel Bunkering

To estimate total economic contribution of the fleets required two conceptually straightforward steps: (1) multiply the vessel expenditure estimate by the number of vessel port calls and (2) determine an appropriate multiplier for calculation of indirect and induced expenditures resulting from direct expenditures. However, before making these calculations, the problem of fuel expenditures must be addressed.

Expenditures for Fuel Bunkers

The estimation of expenditures on diesel bunkers poses special problems. As can be seen from Tables 7 and 8, a considerable variation exists between the various estimates for both purse seiners (~30%) and longliners (~100%). This variation is magnified due to relative size of fuel purchases vis a other expenditures. Depending on the type, size, and operating patterns of a vessels, fuel costs typically account for from 33-38% (purse seiners) to 18-20% (longliners). In addition to the size/operating patterns of vessels, there are additional reasons for the variation between the estimates. Of all expenditure items, fuel is one of the most volatile and, over time, is subject to wide swings in the basic price and in the tax rates and other charges applied by the local jurisdiction. This means that even small intervals between expenditure surveys can show substantial variation in the expenditure estimates. To avoid some of these problems, we chose to base our estimate

of fuel costs on information on engine horsepower and fuel consumption developed in a prior study.[18]

This study suggested that purse seiners licensed to operate in the Pacific were powered by diesel engines with a median engine of 3600 horsepower and consuming ~500,000 gallons of fuel/year.[19] This equates to ~145,000-165,000 gallons of bunkers/voyage. Once the consumption of fuel was determined, expenditures are readily estimated using 1993 bunker prices. At an average 1993 diesel bunker price in Guam of $0.73/ gallon ($0.89 in American Samoa), this equates to a fuel expenditure of ~ $105-120,000 /port call ($130-150,000 /voyage in American Samoa). It should be emphasized that these fuel consumption numbers were for the median size (horsepower) seiner and were linked to typical operating patterns and voyage lengths.[20]

Comparable horsepower-derived fuel estimates were developed for longliners. For vessels operating in the sashimi trade with a median horsepower of 500, the model predicted fuel consumption would be about 13,000 gallons/voyage. On 1993 bunker prices this equates to an average port call expenditure in Guam of $9500 ($11,600 in American Samoa). This number compares favorably with estimates made for longliners operating into/from the port of Honolulu[21] and estimates developed by the American Samoan Government. However, it is substantially greater than fuel consumption/ expenditure estimates of $4,000 included in the Guam Longline Study and adopted in the Government of Guam cost estimate study. In follow-up interviews with oil company executives, port call expenditures of between $8,000 and 10,000 were quoted as being typical.

Given the overall importance of fuel bunkers to longliner economics and the considerable differences between the Government of Guam longliner survey results on the one hand and the impression of oil company executives (and their estimates of horsepower generated) on the other hand, we decided to undertake a detailed evaluation of the longliner fuel question. By using Guam Port Authority records, we obtained information on 2120 longline vessel refuelings over the period 1992-1994. Over this period, the average longliner took on almost 8,200 gallons of diesel fuel per refueling call.[22] At $0.90 per gallon, this figure represents average vessel expenditures of nearly $7,380 and annual fuel sales in Guam to the longline fleet of about $5,215,200.

This number and potential changes in fuel purchases in Guam should be seen against the background of the changing pattern of longline landings. Historically, these landings have

---

[18] "Fuel Use in Tuna Fishing." : Forum Fisheries Agency, Honiara, 1990.

[19] In the original study, these fuel consumption numbers were compared with the actual experience of several vessel operators and vessel feasibility studies and seemed to be about right.

[20] This assumption is important to fuel consumption because on a year-to-year basis the primary fishing grounds for purse seiners may move eastward (toward the American Samoa cannery discharge port) or westward toward Guam to affect fuel consumption and expenditure at each port.

[21] Lucas, E.L. and Iversen, R.T.B., *Foreign flag fishing vessel expenditures in the port of Honolulu*, Studies in Marine Economics, September 1992.

[22] The actual calculated number was 8,194 gallons/refueling.

been almost exclusively for the Japanese sashimi trade. However, with the recent emergence of frozen transshipment from Guam, this pattern may change and result in an increase in the average refueling sale for several reasons. First, longliners serving the sashimi industry have substantially different voyage patterns than vessels providing frozen tuna to canneries.[23] Second, in the past longliners fishing for cannery grade tuna made extensive use of mother ships both to refuel and re-provision the longliner fleet fishing in Micronesian waters, a pattern which appears to have changed. Third, most sashimi longliners are smaller and have lower horsepower engines than the median vessel registered with the FFA.

Even for American Samoa where the calculated figure more closely reflects government estimates, vessel refueling is in a rapid transition, reflecting a major increase in the size of longline vessels operating into/out of Pago Pago over the last several years. In interviews with local managers of FCF company (which services 22 of the 80 longliners calling at American Samoa), a fuel expenditure of $73,000 per port call was suggested. This number was independently confirmed by officials at BHP Petroleum, which is the sole supplier in American Samoa.

Thus, it appears that for both American Samoa and Guam previous estimates of fishing vessel fuel expenditures may be somewhat outdated. However, this finding may not be as important as it may first seem because fuel charges–while important to fishermen and fuel suppliers–have only limited multiplier impacts on the local economy (see below) and, being internationally determined, are of only limited importance relative to other factors, in determining vessel port calls.[24]

Composite Estimates for Maximum and Low Impact Scenarios

Table 10 (Guam) and Table 11 (American Samoa) present aggregate direct shore expenditure data for all fishing/tuna transport vessels using the study area ports for the year 1994. While infrequently made expenditures may have been missed, we believe that the expenditure totals cover the main categories of direct expenditures and are indicative of the total value of the direct economic impact of the tuna fleet.

---

[23] Because freshness is a major determinant of sashimi prices, vessels serving this market spend a greater proportion of their time in port than the cannery longliners.

[24] Other factors of equal or greater importance are conditions attached to fishing licenses (longliners operating in Micronesia), the availability of good maintenance facilities and shore leave opportunities for crews, and the economics of direct sales versus transshipment to canneries (American Samoa).

Table 10
Direct Shore Expenditures in Guam for 1994[1]
(US$ millions)

	Max Expend			Low Expend		
Expenditure	Seiners	Longliners	Total	Seiners	Longliners	Total
Fuel	40.2	12.0	52.2	24.1	4.8	28.9
Crew	16.3	4.2	20.5	8.6	2.9	11.5
Food	16.1	2.8	18.9	6.0	2.9	8.9
Misc.	17.7	0	17.7	0.4	0	0.4
Ice/Salt	8.0	0.7	8.7	0.6	0.7	1.3
Port	4.0	0	4.0	4.0	0	4.0
Total	102.3	19.7	122.0	43.7	11.3	55.0

[1]Source: Calculated from Tables 7 and 8

Table 11
Direct Shore Expenditures in American Samoa for 1994[1]
(US$ millions)

	Max Expend			Low Expend		
Expenditure	Seiners	Longliners	Total	Seiners	Longliners	Total
Fuel	39.4	13.3	52.7	28.4	2.3	30.7
Crew	3.6	4.2	7.8	3.6	0.7	4.5
Food	4.5	3.7	8.2	4.5	2.7	7.2
Misc.	4.3	5.1	9.4	–	–	–
Ice/Salt	9.0	.1	9.1	1.6	0.1	1.7
Port	4.5	–	4.5	0.8	–	0.8
Total	65.3	26.4	91.7	38.9	5.8	45.7

[1]Source: Calculated from Tables 7 and 8

In addition to these voyage-linked expenditures, fishing vessels also require periodic maintenance and repair services. While some sources (government of Guam) tried to allocate these expenses on a port call basis, other sources (Carter in Guam and South West Marine in American Samoa) saw these expenses as annual cost per vessel. In theory it should not matter which approach is taken if it is consistently used.

2. Assessing Indirect and Induced Expenditures

Background

Of the 3 areas studied, only American Samoa had an analytical framework for evaluating the indirect/induced impact of new development projects. In the case of American Samoa, a 21 sector input-output matrix was available from a 1977 study. Although preliminary and dated, the American Samoan matrix was deemed to be adequate for the purposes of this study. For both Guam and CNMI, there was no comparable information available, and it was necessary to infer multipliers and induced impacts from studies undertaken elsewhere. While clearly unsatisfactory from an analytical point of view, this use of proxy coefficients yielded estimates which are probably indicative of aggregate economic activity.[25]

[25]In general, output multipliers increase with the size of the economic unit being studied (e.g., California

For Guam the multipliers for induced expenditures for each of four cost groups were derived from the State of Hawaii's Marine Industries Input-Output Table. [26] To augment this basic information, follow-up interviews were done with tuna fleet supplier/vendors. In the follow-up interviews, an attempt was made to identify local production ratios. However, in the case of bunker fuel expenditures, the Hawaii data was of only limited interest since neither Guam nor American Samoa have the petroleum refining capacity available in Hawaii. In other words, the local content of fishing vessel bunker fuel consumed in the study areas was considerably lower than that reflected in the Hawaii multipliers. The output multipliers used in the study are presented in Table 12.

Table 12
Indirect and Induced Multipliers Used in the Study

Industry	Hawaii	Samoa
Agriculture	1.97	1.29
Fishing	2.23	2.33
Food Processing	2.47	1.13
Petroleum Refining	1.29	n/a
Ship Building & Repair	2.03	1.75
Other Manufacturing	1.83	1.31
Construction/Maint.	2.03	1.34
Transport		1.34
Ocean	2.4	
Other	1.92	
Communications	2.15	1.54
Utilities	1.66	1.46
Trade		1.84
Wholesale	2.14	
Retail	2.26	
Eating & Drinking	1.42	1.84
Banking & Real Estate	1.69	1.99
Hotels	2.22	2.22
Services		2.26
Repair	1.74	
Other	2.44	

would tend to have a higher multiplier than, say, Hawaii for a given level of direct expenditure). We believe that the proxies used in the study probably tend to overstate the actual secondary economic impact taking place. On the other hand, even a cursory examination of (1) the types of direct expenditures made by the tuna industry and (2) the entrepot nature of the territorial economies suggests that secondary and induced impacts are likely to be fairly modest under even optimistic assumptions.

[26] Numerous other analytical studies in Guam have used multipliers taken from the State of Hawaii Input-Output matrix.

Assumptions Used in Estimating Indirect and Induced Expenditures

Local Content of Fuel Bunkers. Although a number of oil companies operate in Guam only two companies (Shell and BHP) have a significant fishing vessel bunker business. Of these two companies, BHP has a substantially larger market share.[27] From interviews with oil company personnel, we believe that ~$1.4 million in wage payment annually can be allocated to fishing bunker sales. In addition, the government of Guam receives fees associated with income tax payments and a throughput charge of $.15 /barrel of product. While the throughput fee is readily calculated, it is not possible to disentangle the bunker component of petroleum company taxable profits from other business lines.

On the basis of interviews with BHP in American Samoa, we believe that bunker associated wages in 1993 were in the range of $400,000/year. In addition, BHP made significant payments to the American Samoa government through a 4 cent/gallon terminal fee, a 3.5 cent/gallon excise tax, and a 3 cent throughput charge (total charges=10.9 cent/gallon). Using 1993 bunker sales of 693,000 barrels[28] (29 million gallons/year), we believe that total local expenditures related to fishing bunkers was about *$ 3.2 million.*[29]

Vessel Provisioning. In Guam, as with American Samoa, almost all food supplied to the fleets is imported. Because commercial agriculture is extremely limited, only a small fraction of vessel reprovisioning actually comes from local growers. The usual pattern is for fishing vessels to purchase food directly from grocery wholesalers or retailers, and, in the case of the Guam longline industry, most of this business goes to two firms. Alternatively, some of the larger purse seiner operators buy U.S. mainland food and directly import it into Guam in refrigerated containers. For re-provisioning expenditures, we felt that the wholesale trade multiplier best represented the Guam situation and that the somewhat more inclusive "trade" multiplier was appropriate for American Samoa.

Shore Leave Expenditures for Vessel Crews. While the shore expenditures of fishing crews are most commonly thought of in terms of "entertainment" expenses, in fact a substantial fraction of total shore expenditures are linked to more mundane items like hotel expenses, eating and drinking, and air travel. Because our expenditure information did not detail exactly how crew members spent their shore leave money, we decided to arbitrarily allocate 50% of their expenditure to food/entertainment and 50% to hotels.

3. Direct and Indirect Expenditures

Table 13 brings together the direct expenditure data and the input-output multiplier analysis. We view Table 13 as an indicative estimate of the direct and induced impact of

[27] BHP has now left the Guam fuel bunkering business.

[28] Estimate based on total diesel consumption of 924,000 barrels of which fishing vessels are assumed to use 75%. (Personal communication with American Samoa Petroleum Supply officer and confirmed by BHP Petroleum).

[29] Note that there was reportedly a significant decline in fuel sales to seiners beginning in June 1995 with bunker sales being about 30% lower by May 1996 than they were for the same month a year earlier (see below).

tuna fishing in 1994. Readers need to understand two things about this basic estimate. First, the estimate is confined to direct fishing vessel activities only and does not include the potential impact of fishing-related activities including air freight, reefer/container transshipment,[30] and, of course, the American Samoan canneries. These related activities exist in a sort of symbiotic interdependency with the fishing vessels, and, in practice, combine to create a tuna fishing industry or tuna fishing sector. While we will make a preliminary assessment of the impact of these related activities in the appendix for American Samoa, our reason for not including them in the basic estimate is purely pragmatic. We strongly believe that the industry is in such a dramatic transition that 1994 expenditure on these related activities are probably *NOT* indicative of either historical or future patterns of economic impacts.

Table 13
Results of Analysis: Direct and Indirect Expenditures by Tuna Vessels in 1994
(US$ millions)

Scenario	Direct Expenditure	Value of Secondary & Induced Multiplier	Total
Maximum			
American Samoa	91.7	56.0	147.7
Guam	122.0	80.4	202.4
Low			
American Samoa	44.8	22.0	66.8
Guam	55.1	35.7	90.8

III: Assessment of the Tuna Industries in American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam

This section of the report combines the analysis of vessel expenditures in the second section with additional information on the contribution of tuna processing and transshipment in American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam. It also puts those contributions in the context of the industry trends discussed in the first section.

A. American Samoa

The Van Camp Seafood's Samoa Packing and StarKist canneries in American Samoa have struggled to remain viable in the face of intense competition from foreign processors. As already discussed, these canneries were established and have remained viable for several reasons. First, American Samoa is exempt from the Nicolson Act, which prohibits foreign boats from landing fish on US soil. Second, Headnote 3(a) of the US Tariff Schedule allows exports from US commonwealths and territories duty free

[30] Government estimates of the economic impact of the canneries on the American Samoa economy have also been included in the appendix.

entry to the United States. The third statutory provision that has allowed the canneries to remain viable is Section 936 of the Internal Revenue Act. This provision effectively makes income derived by the US parent companies of the Samoa operations exempt from US corporate income tax. These provisions under US law, tax exemptions provided by the American Samoa government, and the wage structure in Samoa have made it advantageous for the parent companies of StarKist Samoa and Samoa Packing to continue operating in the territory.

Although distant from the rapidly evolving transshipment/provisioning patterns in Micronesia, American Samoa is not immune to the spreading ripples of change in that area of the Pacific. It is possible that any decline in frozen tuna shipments from Tinian in favor of containerized shipments from Guam will affect fish supplies to the Samoan canneries. Because there is no direct container vessel service between Samoa and Guam, it is likely that most if not all of the containerized catch will be destined for Asian or Puerto Rico processing centers. Fortunately for American Samoa, both the volume and the percentage of transshipped fish steadily declined over the period from 1990 to 1993 (see Table 14).

Table 14
Fish Supply to the American Samoa Canneries

Year	Direct Unloading from PurseSeiners		Transshipped (*)	
	tons	%	total tons	%
1990	98600	76%	31005	24%
1991	112821	79%	30466	21%
1992	129807	84%	24721	16%
1993	149795	91%	15058	9%

Notes: 1. (*) Fish unloaded from reefer vessel or refrigerated container.
2. Does NOT include Albacore or non-tuna species.
3. Does NOT include longliner catch sold to canneries.

Another potential impact of the demise of the Tinian transshipment operation and the construction of the Zuanich cannery in Madang is the loss of the "Z" boats as suppliers of tuna. Madang in PNG is much better located vis-á-vis the Western Pacific fishery, and the Zuanich boats discharging in Madang would have access to prime fishing grounds in the Margado Square–an area which is not currently being intensively fished. Thus, development of a cannery at Madang might well affect both the supply and the demand for tuna caught in the Pacific islands region. Table 15 presents preliminary statistics on the potential impact of a withdrawal of the Zuanich seiners from the Guam/American Samoa tuna trade. This data suggests that even a total withdrawal (which is highly unlikely) of the "Z" fleet as a supply source for the Samoan canners would have only a marginal effect on fish supply.

Table 15
Fish Supply from "Z" vessels

Year	Fish Sourced "Z" Vessels (Tons)	Total fish Unloaded (Tons)	"Z" Fish as % of total landings
1990	12,873	129,605	9.9%
1991	11,294	143,287	7.9%
1992	6,349	154,528	4.1%
1993	13,502	164,853	8.2%

The threat of StarKist Samoa shutting down is much more ominous than any changes in the supply of fish from the Micronesian area. If one of the Samoan packers were to cease operation, more than half the tuna fleet expenditures would disappear from the American Samoa economy. If both of the American Samoa tuna canneries shut down entirely, the economic consequences could be disastrous. Closure would mean a direct loss of nearly 35% of wage employment in the territory. The power authority would lose major customers for electricity and water and the prices of these services to remaining consumers would increase. The American Samoa government, while attempting to recover from a major financial crisis, would lose corporate taxes paid by the canneries themselves as well as taxes on cannery wages. The greatest loss could, however, be the economic activity generated by the fleets.

The recent development of the off-shore fueling operation reportedly initiated by the fleet associated with StarKist Seafood is a further indication of potential impact of a loss of the canneries or the fleet. As already noted, above, fuel sales to the seiner fleet owned by a subsidiary of StarKist Seafoods and H.J. Heinz began taking fuel from a tanker off-shore at a cost savings of $0.16 per gallon in June 1995. This has resulted not only in a loss of business to BHP Samoa, the only fuel supplier, but a loss in tax revenues that could total almost $1 million per year.

For the time being, it appears that both StarKist Samoa and Samoa Packing will continue to operate. There will always be some uncertainty as to whether the canneries will remain in the territory as foreign competition exerts downward pressure on canned tuna prices, and production costs remain high in comparison to processing plants in Southeast Asia.

In response to their continued, somewhat tenuous situation, it is possible that StarKist and/or Samoa Packing might increase production. StarKist has discussed the possibility of increasing throughput by modernizing its plant. Increased throughput could result in attendant increases in the number of vessels making port calls. An increase in fishing vessel port calls (versus the receipt of frozen tuna from reefer or refrigerated containers) could have a positive impact on American Samoa's tuna-dependent economy. Per ton of off-loaded tuna, seiner port calls imply greater expenditures of fuel, food, equipment repair, and crew R&R expenditures than reefer vessel port calls. Beyond these support expenditures, fishing vessels clearly require some services like net repairs and fishing supplies which are not required by reefer vessels.

American Samoa could increase the benefits of the fishing fleets that call at Pago Pago by developing or expanding industries that can sell goods and services to the fleet. Southwest Marine, which was privatized several years ago, reportedly lost business because boat owners felt the quality of ship servicing and repair declined. In 1994, the manager of Southwest Marine reported that business was increasing as a result of improved service and quality control. A further increase in that enterprise could result in an increase in employment and in local goods and services purchased by the company. Expansion of cash crop agriculture could supply the fleets with produce that is now imported. Development of new food processing businesses could also take advantage of the fishing fleet market.

Guam

In considering the level of tuna related economic activity on Guam, it is important to keep in mind that the island serves two very different market segments: (1) the servicing of longline and purse seine fishing vessels in the Port of Guam and (2) the provision of air cargo services for fresh tuna transport through the Guam Airport. As noted above, each of these market segments is subject to different forces, and, while historically strong links have existed between the two service areas, there is reason to believe that these links may now be breaking down as a direct consequence of air links with the Micronesian fishing nations.

Guam has long functioned as the center of the tuna support and provisioning industry in the central Pacific. The Port of Guam's advantages as a Western Pacific resupply base include the following:

- A well developed and highly efficient port;
- The availability of relatively low cost (and low tax) vessel fuel;
- A well established marine supply/repair industry; and
- Recreational amenities for crew shore leave.

These advantages have combined to make the territory the most important re-supply center for tuna vessels of all technologies and nationalities in the Pacific.

Guam has traditionally enjoyed a comparative advantage as a fresh tuna transshipment point but, until recently, transshipment has been focused primarily on transfer of fresh tuna landed at the Port of Guam to airplanes bound for Japan. Table 16 presents data on both port calls and on the number of fishing vessels home-ported in Guam.

Table 16
Guam Longliner Port Calls

Year	Port Calls	Vessels Based in Guam
1990	1,450	328
1991	1,078	233
1992	846	246
1992	1,089	270
1994	1,509	348
1995	2,580	480

Source: Port Authority of Guam

By 1992-93 this role began shifting toward transfer of fish between small "collector or feeder" aircraft bringing fresh tuna from FSM and Palau ports and larger commercial aircraft flying directly to Japanese airports. The decline in port calls by longline vessels in 1992 resulted in protests by the government of Guam against the land locally policy adopted in June 1991 in the Federated States of Micronesia. This controversy was being further fueled by a perception that air cargo space on jumbo jets carrying tuna to Japan was being taken up by fish coming into Guam on feeder aircraft. However, by 1993 the downturn in port calls by longliners reversed, and 1994 and 1995 were record years for longliner port calls to Guam. In addition to the resurgence in longliner port calls, concern over the potential loss of the longline industry has been further quelled with the development of a new transshipment operation that is air freighting fresh tuna to Europe.

In comparative financial terms, Guam has benefited more from the home porting of purse seiners than it has from calls by longline vessels. As shown above, port expenditure for purse seiners are clearly significantly higher than they are from longliners. Recognizing economic benefits of purse seiners, the Chamber of Commerce of Guam proposed a waiver of port charges and a requirement to use local stevedores for off-loading fish. In 1994, the Port Authority of Guam granted a waiver for a period of one year to encourage more purse seine vessels to home port and provision in Guam.

The purse seiner industry on Guam has not been, until recently, based on transshipment. While some transshipment has taken place in Apra Harbor with reefer vessels taking tuna directly from the seiners, most of the seiners calling at Guam transshipped their fish in Tinian. As a result, Guam has benefited much more from the transshipment base at Tinian than has the Commonwealth of the Northern Mariana Islands.

The development of the Casamar-American President Line joint venture for container transshipment of frozen tuna may provide a new incentive for purse seiners to call at Apra Harbor. While in full operation only for several months, it appears that the 30% cost savings for transshipment offered by this operation has proven attractive to purse seiners operating in the western Pacific. How many of the boats transshipping through Guam would have called there in any event is not clear, nor is the impact on the transshipment operation on Tinian.

At this point in time, it appears that the current level of benefits to Guam from the longline and the purse seine industries will continue for the foreseeable future. Guam could lose some of its longline support activities as a result of changes in fishing patterns, market structure, or policies in neighboring countries. This loss could be offset by an increase in frozen tuna transshipment activity. However, this substitution, in fact, represents a substantial loss to Guam's economy because seiners have historically reprovisioned in Guam after discharging their catch at Tinian.[31] Thus, the new pattern means that while Tinian may lose most of its frozen tuna transshipment business to Guam, there will be only a modest increase in economic activity on Guam. On the other hand, Guam's loss of its long line vessel support activities are unlikely to be offset by the resulting increase in air freight transshipments from the Freely Associated States.

Commonwealth of the Northern Mariana Islands

The Tinian Connection. Use of the Tinian transshipment facility has been steadily declining since 1991. This decline has been accompanied by a change in the nationality of the vessels which have been transshipping their catch. At its peak, Tinian was supported chiefly by American seiners (particularly vessels owned by the Zuanich family) and by Taiwanese seiners. In recent years, use by both Taiwanese and Zuanich interests has declined dramatically. The annual volume transshipped at Tinian continues to decline and, in 1994, was less than 30% of the volume handled three years earlier (see Table 17).

Table 17
Tuna Volume and Vessel Calls at Tinian Transshipment Port

Year	Port Calls by "Z" Boats	Port Calls by Others	Transshipped Tonnage
1989			52,821
1990			64,353
1991			72,405
1992	32	46	46,505
1993	20	24	22,215
1994	2	25	19,782

A major victim of any Zuanich re-deployment to PNG was likely to be the Tinian transshipment facility. All of the agents interviewed on Tinian in 1994 were pessimistic about the future of transshipment activity. They reported that the decline in transshipment activity had started before plans for the Madang cannery were announced. Nevertheless, news about the move of the Zuanich fleet to PNG was seen by agents as signaling the end of transshipment in Tinian. In addition, the Casamar/ APL container shipment facility in Guam poses direct competition to Tinian. However, it will probably be months before the impact of the new container transshipment operation on Guam can be assessed.

[31] Table 17 illustrates the net direct effects of the new long line provisioning patterns and clearly shows a significant potential reduction in the value of port services in both Guam and Tinian.

The benefits to the CNMI economy from the transshipment operation at Tinian was relatively small compared to the benefits that accrued to Guam. While data on the benefits of the Tinian transshipment operation are limited, interviews with agents in Tinian in 1994 revealed that benefits are linked to the following expenditures:

1. crew expenditures (including limited shore leave/R&R)
2. minor provisioning
3. stevedoring (fish handling/loading employment)
4. port fees and services
5. warehousing
4. electricity consumption

Stevedoring activities to load reefer vessels employed 40 local employees, and fishing vessel unloading provided work for another 70 employees (mostly Filipino nationals). Using an average wage of $6000 this employment would generate about ~ $660,000 in direct income to the island. While very little re-provisioning and no vessel bunkering takes place on the island, crew R&R shore leave expenditures were relatively substantial. Shore leave advances for a typical reefer crew of 20 were estimated to be between $800-$1000 per crew member while shore allowances for a typical seiner crew of 17 were between $200-$300 per crew member. Assuming the midpoint for these estimates, the transshipment port would, in 1994, have injected about $60,000 per month ($720,000 annually) into the local economy. Taken together, the direct impact of tuna transshipment activities on Tinian probably does not exceed US$1.4 million.

The future of the Tinian transshipment facility will likely turn on three factors:

- whether Taiwanese vessels continue to use the port in significant numbers;
- whether the Zuanich fleet is redeployed to PNG or other locations in the region; and
- the comparative economics of the Casamar/APL container operation in Guam.

Saipan Air Transshipment. As discussed above, Saipan has emerged as a major air cargo hub for sashimi grade tuna transshipment. While complete statistical data are not available, the data in Table 18 gives some indication of the growth in this activity.

Even though CNMI transshipment generates up to US$ 750,000 in air freight revenue per flight to the airlines, the economic benefits of the Saipan operation is small–even in comparison to the minimal benefits derived from the transshipment base on Tinian. Value-added in Saipan from this lucrative trade consists of (1) stevedoring services for fish transfer between planes, (2) fuel sales and taxes to the 727 feeder aircraft, and (3) modest landing fees. A major part of the tuna stevedoring services at Saipan are handled by Pacific Orient Company. Pacific Orient handles 30-35 tons per flight on 8-10 flights per day during the peak season. Pacific Orient employs 10 workers and has annual revenues of $300-400,000.

What the future holds for the air transshipment operation in Saipan remains to be seen. It appears unlikely that the CNMI government can increase the economic benefits of the relatively new industry without running the risk of driving it away. Any increase in landing fees or jet fuel tax or the imposition of some form of transfer tax would probably make it more profitable for Ting Hong, or other operators, to find an alternative way of air freighting fish to Japan.

Table 18
Tuna Transshipment through Saipan Airport

Year	Quarter	Number of Landings	Capacity Index
1992			
	1st Qtr	3	1.0
	2nd Qtr	47	12.0
	3rd Qtr	86	21.0
	4th Qtr	67	14.4
1993			
	1st Qtr	17	3.2
	2nd Qtr	133	15.2
	3rd Qtr	181	34.2
	4th Qtr	118	19.8
1994			
	1st Qtr	22	3.5

Note: Capacity Index based on aggregate landing weight for quarter/ aggregate landing weight for 1st Qtr 1992.

The most obvious alternatives to Saipan for transshipment operators are to transship fish in Guam or fly fish directly out of the FSM and Palau to Japan. While it was impossible to get a complete accounting of the cost structure of either the Guam or Saipan transshipment operation, it appears that the major costs of these alternative options are only marginally higher than the existing arrangements. Air freight charges out of Guam were $0.30 to $0.37 per kilogram higher than Saipan, and most transshippers were generally willing to pay the higher cost in Guam because the flight schedules were more compatible with market requirements in Japan. In 1994, the air freight charge for fish flown from Saipan to Japan was about $0.33 per kilogram less expensive on commercial jumbo jets than on charters into Japan. Unless other costs on Saipan are significantly less than either of these alternatives (assuming there is sufficient air freight capacity out of Guam), it seems likely that transshippers will opt out of Saipan if new costs or taxes are added by the CNMI government.

IV. Summary, Conclusions, and Recommendations

Comparative advantage has been the driving force in the establishment and development of the tuna industries in American Samoa, Commonwealth of the Northern Mariana Islands, and Guam, and comparative advantage continues to drive changes now taking place in the industry. The competitive nature of tuna fishing, transshipment, and processing have made the individuals and corporations involved extremely cost

conscious. Downward pressure on prices for fish and canned tuna from global competition have made necessary for those involved in the industry to consider every opportunity to cut the costs of doing business.

Competition among the countries and territories seeking to attract fleets, transshippers, and processors has driven governments to seek ways to increase their comparative advantage by lowering the costs and increasing the supply of goods and services. As more countries and territories have gotten into the industry, it has become more difficult to predict what tuna boat owners and captain, transshippers, and processors will do. For American Samoa, Guam, and the Northern Mariana Islands, changes in US trade and tax policies further compound the uncertainty.

These competitive forces have made tuna fishing, transshipment, and processing very dynamic industries for many years. All three are potentially lucrative but extremely competitive. American Samoa, Commonwealth of the Northern Marianas, and Guam are relatively well placed geographically to continue to participate in different segments of the Pacific tuna industry. Understandably, developing countries in the Pacific also want to increase the value added by their tuna fisheries through participation in transshipment and processing. Many of those countries have lower wages, lower taxes, and less environmental regulation and some are closer to the primary fishing grounds than American Samoa, Commonwealth of the Northern Marianas, and Guam. They are, therefore, potential competitors and threats to the continued viability of the canneries in American Samoa, the transshipment operation in Tinian and Saipan, and the home porting and transshipment operations in Guam.

The analysis presented in this report shows that there are substantial economic benefits from tuna fishing and transshipment for American Samoa, the Commonwealth of the Northern Marianas, and Guam and that each jurisdiction has benefited in different ways. In American Samoa, the tuna industry is by far the largest private industry, the largest source of direct private sector employment, and the largest private consumer of power and water. While the canneries themselves are the largest identifiable private employer, the presence of the fleets could account for as many as 1,200 additional jobs. Fuel purchases by the fleets probably also contribute to the relatively inexpensive prices for petroleum products and electricity in the territory.

Guam's home porting and transshipment operations are small by comparison to the tourism industry and generate only a fraction of the jobs associated with the US military presence. However, vessel home porting and transshipment make important contributions to the diversification of Guam's economy. As a result of fluctuations in the tourism industry and recent cuts in military expenditures in Guam, the importance of diversification has increased. If the business community and government of Guam continue to be aggressive about attracting more tuna vessels and providing a greater range of services and supplies, tuna fishing and transshipment will expand in importance to Guam's economy.

CNMI's transshipment operations are also very small compared to the tourist industry in the commonwealth. The Tinian transshipment facility, while generating relatively few jobs and economic activity for the entire economy, has historically been very important to the local economy of Tinian. It is also one of the few industries not directly tied to government expenditure or to the volatile tourism industry. Air transshipment of tuna through Saipan is far less beneficial to the people of CNMI than the operation on Tinian but still makes a modest contribution through stevedoring services, fuel taxes, and landing fees.

There is scope for increasing the benefit from the presence of the tuna fleets in all three jurisdictions. The primary way benefits can be increased is to expand the provision of goods and services, and this should be encouraged in Pago Pago, Tinian, and Guam for the sea port operations. Unfortunately, there appears much less scope for increasing the benefits from the air transshipment, the activity that has experienced the most growth in the past four years.

In order to maintain the level of economic benefits from tuna fishing, processing, and transshipment, the governments of American Samoa, Commonwealth of the Northern Marianas, and Guam will need to closely monitor the tuna-related businesses now operating within their shores as well as changes in the costs of goods and services in neighboring countries and in the global tuna industry. Unfortunately, the three governments have little control over these external forces. However, if they can anticipate changes in their local industries and in the costs of fuel and other goods and services important to the tuna industry in neighboring countries, they may be able to respond to remain competitive.

While all three governments generously provided a great deal of information for this study and continue to gather valuable data on their tuna operations, there are gaps that should be filled. This is particularly important as new transshipment operations emerge such as the air transshipment operations on Guam and Saipan. The governments also need to develop the capacity to analyze the data they gather in the context of a good understanding of how tuna industries operate.

At some level, the economies of American Samoa, Commonwealth of the Northern Mariana Islands, and Guam are linked through their tuna fishing, transshipment and processing operations. Some of the fish transshipped at Tinian finds its way to the canneries in American Samoa. Seiners operating in the Western Pacific can choose to offload their catch in American Samoa, Tinian, or Guam. Agents involved in the sashimi trade can fly their fish into Guam or Saipan for transshipment to Japan. As a result of these linkages, decisions in one jurisdiction can have an impact on the tuna related industries in the other jurisdictions. Therefore, the governments may want to consider consultations on policies that will affect changes in the tuna related industries now operating and those that may develop in the future.

Evolving Trends in Guam and CNMI Which May Affect the Future of Tuna Operation

As with their Micronesian neighbors, a number of emerging policy issues may be important in shaping the future of the tuna industry in the US territories and commonwealth:

- Proposed changes in the Magnuson Act will increase the participation of the territories and commonwealth in the management of their 200-mile exclusive economic zones. If enacted, these changes may make it possible for the American territories and commonwealth to interact more directly with the Forum Fisheries Agency and its member countries. This could, in turn, increase opportunities for policy coordination with neighboring states.
- Guam's development plan anticipates a doubling of tourist arrivals by the year 2001. This implies expanded air freight capacity to serve the Japanese sashimi market.
- There are renewed attempts to establish milkfish aquaculture as an alternative to importation of frozen longline bait.

The three economies discussed in this report are also linked to other economies in the Pacific Islands region. It should be clear from recent history, that the home porting and transshipment operations in Guam and Saipan are sensitive to policy decisions in the Freely Associated States. Not surprisingly, attempts to gain more benefits from fish harvesting fleets operating in the Freely Associated States can have negative impacts on the home porting operation in Guam and CNMI. However, without locally-based fuel, provisioning and repair services, the benefits lost to Guam or CNMI may not automatically accrue to the Freely Associated States. Instead, these benefits may quite easily be captured by foreign supply ships. While all countries and territories in the region are potential competitors for the benefits of tuna transshipment and processing, some potential gains may not be realized unless tuna policy development throughout the region is coordinated.

Evolving Trends in Micronesian Tuna Policies Which May Affect the Tuna Industry in the American Territories

Since there is no significant tuna fishery in the waters of Guam, CNMI or American Samoa, the fish harvesting strategies of neighboring (Micronesian) states are important considerations in assessing future development in the territories and commonwealth. These countries (Palau, Federated States of Micronesia, and Marshall Islands) are members of the Forum Fisheries Agency and generally look to that organization for technical assistance and intraregional policy coordination. This association with other independent fish harvesting states has, without doubt, been of considerable benefit to the Micronesian countries. However, one unfortunate casualty has been a deterioration of policy communication between the Freely Associated States and the American territories. This has led to a competitive and often suspicious attitude between policy makers in the Micronesian states and their counterparts in the US territories. We believe that as

integration of tuna harvesting, processing/transshipment and boat provisioning in the Central Pacific increases, a strong case can be made that closer liaison will be in the interest of all parties.

It is reasonably clear that after nearly a decade of searching, each of the Micronesian countries has adopted a more or less articulated development strategy for tuna activities. Although these development strategies vary greatly between the three Micronesian countries, they have a shared desire to increase value adding shore base activities currently being provided in the American territories. Planned and proposed activities which may have a significant impact over the next five years include the following:

- the prospects for direct air links between Palau and Japan, possibly using wide-bodied aircraft;
- the (potential) transshipping of frozen tuna in Chuuk using refrigerated containers;
- plans for a major new longline base at Enewetak atoll in the Marshall Islands.

Successful implementation of the Micronesian strategies will, depending on trade and transportation links with territories and commonwealth, have different impacts on Guam, CNMI, and American Samoa. Similarly, successful efforts by the US territories and commonwealth at reducing the cost of operating tuna boats, transshipping operation, and processing will affect the development of tuna industries in the Freely Associated States.

At a more general level, the tremendous increase in longline fishing in the Republic of the Marshall Islands, Federated States of Micronesia, and Palau since 1991 should be of concern to the Western Pacific Regional Fishery Management Council (WESTPAC), the Forum Fisheries Agency, and the jurisdictions they serve. The conventional wisdom seems to be that the tuna stocks being targeted by longline vessels are healthy and the increased effort in the Freely Associated States (FAS) is unlikely to threaten the sustainability of the tuna stocks being targeted. However, the huge increase in the level of fishing effort in the FAS could potentially have an impact on other species including turtles, sea birds, and sharks, as bycatch.

The huge increase in the amount of sashimi-grade tuna being sent to Japan may also be a matter of concern. The market price of the species and grades of tuna imported from the Freely Associated States, Guam, and Saipan is governed by supply and demand. Guam and the Freely Associated States benefited from the increase in demand during the early 1990s. The downturn in the Japanese economy coupled with the increasing supply of fish has reportedly already driven down the price of tuna. If this trend continues, the costs of transshipping tuna through Guam and Saipan will be too high for the agents and transshippers to continue to operate.

Changes in US Policies and the Future of Tuna Operations in the US Territories and Commonwealths

The clearest near-term threat to the future of tuna processing operations in American Samoa (and Puerto Rico) is the loss of the tax benefit to the parent companies in the United States under Section 936 of the Internal Revenue Code. Section 936 has been under attack for several years now because US pharmaceutical companies have reaped "huge profits" from Puerto Rico-based subsidiaries which employ relatively few workers in proportion to the US corporate income tax savings they enjoy. Tuna industry representatives in both Puerto Rico and American Samoa argue that their industry is labor intensive and generates many more jobs than capital intensive industries, like pharmaceuticals. They are, therefore, seeking to maintain the tax benefits for tuna processing they have enjoyed under Section 936. Based on this rationale, representatives of the parent companies of the two canneries in American Samoa are seeking an extension of their US corporate income tax credit in order to remain competitive. Without that credit, they maintain that the American Samoa canneries are not financially viable.

Changes in the extension of Section 936 tax benefits to US companies investing in US territories and commonwealth does not appear to be a threat to tuna home porting and transshipping operations in CNMI and Guam. However, any US government support for the development of tuna vessel home porting, transshipment, or processing in the Freely Associated States could potentially threaten the viability of the tuna industries in the US territories and commonwealth. Therefore, the governments of Guam and CNMI should carefully monitor US government discussions with the Freely Associated States on the development of their tuna industries. American Samoa, CNMI, and Guam governments should also seek involvement in talks between the US and the Federated States of Micronesia and the Republic of the Marshall Islands as the compacts of free association come up for renegotiation.

The potential impact of the General Agreement on Tariffs and Trade and the North American Free Trade Agreement could also potentially threaten the viability of the American Samoa canneries. These and other trade agreements could erode or enhance the comparative advantage of the US territories and commonwealth in competing for investment in tuna operations. Therefore, the governments of the US territories and commonwealth and the Western Pacific Fishery Management Council need to carefully monitor changes in US policy that could undermine the viability of existing tuna operations or foreclose the development of new enterprises in the future.

Appendix

American Samoa Government Estimates of the Impact of a Reduction in Production and Closing of StarKist Samoa

In early 1994, the ASG Planning Office undertook an assessment of the impact of a reduction of operations at the territory's largest cannery. This assessment evaluated the consequences of a fifty percent reduction and of total closure of the packing operations and discussed both direct and indirect effects. Table 19 below summarizes the estimates developed for this assessment.

Table 19
Assessment of Cannery Reduction/Closure on the American Samoa Economy

Scenario	Impact	Direct	Indirect
50% Reduction in Operations			
	Local jobs lost	1,000	200
	Wage income lost	$5,000,000	$1,200,000
	ASG revenues lost	$720,000	$24,000
	Loss of purchases	$3,325,000	n/a
	TOTAL Economic Loss	$9,045,000	$1,224,000
Plant Closure			
	Local jobs lost	2,000	400
	Wage income lost	$10,000,000	$2,400,000
	ASG revenues lost	$1,620,000	$48,000
	Loss of purchases	$8,450,000	n/a
	TOTAL Economic Loss	$20,070,000	$2,448,000

A few simple comparisons are useful to put these numbers into the perspective of the American Samoan economy. For example, full closure would represent these losses:

- almost 15% of current wage employment,
- a 10-12% reduction in aggregate household income,
- a 7% reduction in ASG fiscal receipts,
- a 20% loss of power sales,
- a significant increase in fuel costs and upward pressure on cost of living.

Similar data was recently addressed from a different viewpoint. In a letter from Governor Lutali to Representative Faleomavaega (US House of Representatives) the governor estimated the annual impact of local expenditures by the canneries as follows:

Plant Expenses	US$	15.5 million
Employee Expenses	US$	40.0 million
Miscellaneous	US$	2.00 million
Total	US$	57.5 million

The governor then went on to note that the value of the combined exports from both canneries is about US$ 317.6 million or over 99% of American Samoa's GDP.

SH
214.6
.S64
96-05

Hamnett, Michael P.
The contribution of tuna fishing and transshipment to the economies of American Samoa ...

Library
NOAA, National Marine Fisheries Service
SWFC Honolulu Laboratory
2570 Dole Street,
Honolulu, HI 96822-2396

DEMCO

Western Pacific
Regional Fishery
Management Council

University
of Hawaii
at Manoa